EPIDEMIOLOGY

A national survey of the prevalence, incidence, primary care burden and treatment of atrial fibrillation in Scotland

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Objective: To examine the epidemiology, primary care burden and treatment of atrial fibrillation (AF).
Design: Cross-sectional data from primary care practices participating in the Scottish Continuous Morbidity Recording scheme between April 2001 and March 2002.
Setting: 55 primary care practices (362 155 patients).
Participants: 3135 patients with AF.
Results: The prevalence of AF in Scotland was 9.4/1000 in men and 7.9/1000 in women ($p<0.001$) and increased with age (to 71/1000 in individuals aged >85 years). The prevalence of AF decreased with increasing socioeconomic deprivation (9.2/1000 least deprived and 7.5/1000 most deprived category, $p=0.02$ for trend). 71% of patients with AF received rate-controlling medication: β-blocker 28%, rate-limiting calcium-channel blocker 42% and digoxin 43%. 42% of patients received warfarin, 44% received aspirin and 78% receeved more than one of these. Multivariable analysis showed that men and women aged ⩾75 years were more likely (than those aged <75 years) to be prescribed digoxin (men OR 1.41, 95% CI 1.14 to 1.74; women OR 1.88, 95% CI 1.50 to 2.37) and aspirin (2.04, 1.66 to 2.51; 1.79, 1.42 to 2.25) and less likely to receive an antiarrhythmic drug (0.62, 0.48 to 0.81; 0.52, 0.39 to 0.70) or warfarin (0.74, 0.60 to 0.91; 0.58, 0.46 to 0.73). Adjusted analysis showed no socioeconomic gradient in prescribing.
Conclusions: AF is a common condition, more so in men than in women. Deprived individuals are less likely to have AF, a finding raising concerns about socioeconomic gradients in detection and prognosis. Recommended treatments for AF were underused in women and older people. This is of particular concern, given the current trends in population demographics and the evidence that both groups are at higher risk of stroke.

Atrial fibrillation (AF) is the commonest chronic arrhythmia.[1] The prevalence and incidence of AF is believed to be increasing[2] because population age is increasing[3] and survival from conditions predisposing to AF (eg, coronary heart disease) is improving.[4 5] AF causes significant morbidity and mortality, including heart failure (HF) and stroke—two of the most disabling and costly cardiovascular conditions known.[6 7] The risk of stroke can be substantially reduced with warfarin.[8] Two recent trials suggest that rate control and anticoagulation are at least as good as rhythm control, and medical treatment is the preferred option for most patients with AF.[9 10]

Because there is relatively little contemporary information about the epidemiology, primary care burden and treatment of AF in the community, we have analysed the continuous morbidity recording (CMR) scheme. CMR prospectively collects information from general practitioners (GPs) covering individuals broadly representative of the Scottish population in terms of age, sex, deprivation and rural/urban mix (55 practices covering 362 155 people at the time of this analysis).[11] CMR allows accurate estimation of the prevalence, incidence and consultation rates for AF in primary care and description of concomitant medical problems and drug treatment.

METHODS

Everyone in Scotland is entitled to free care from a GP through the National Health Service. GPs are the first point of contact for patients with a medical problem except when emergency hospital care is required; in emergency hospital care, the patient is discharged back to the care of the GP. As described previously,[12 13] in CMR, all contacts with patients (including temporary residents) are captured and recorded by every doctor (including locums). Up to 10 problems can be recorded for each contact, and doctors are asked to describe the problem as specifically as possible in diagnostic terms. Each diagnosis is given a read code along with an appropriate ''modifier'' of ''first'', ''recurrent'' or ''persistent'' to denote whether the problem is new, a recurrence of a previous problem or a continuing problem, respectively.

From 1 April 2001 to 31 March 2002, we identified all patients labelled as ever having AF. The denominator used to calculate the prevalence was the total registered practice population for that year. We estimated the incidence by including all patients with a read code for AF that had a modifier of ''first''. Contact rates (total number of consultations/attendances for the year in which that condition was indicated as relevant to the visit) were also calculated. The average number of contacts per patient was calculated by dividing the number of contacts for AF by the number of patients with AF. Indirect standardisation was used to adjust incidence, prevalence and contact rates for age and sex differences in the practice population.

Post codes of residence were used to assign a Carstairs deprivation category from one (least deprived) to five (most deprived to each individual).[14]

Abbreviations: AF, atrial fibrillation; CCBs, calcium-channel blockers; CMR, continuous morbidity recording; GP, general practitioner; GPRD, General Practice Research Database; HF, heart failure

We compared prescribing data between men and women, and age group categories using χ^2 tests. By using the drug of interest as the dependent variable, we performed multivariate logistic regression analysis to examine the independent effects of age, sex and deprivation category on prescribing of different drugs. The odds ratios were adjusted for potential prognostic factors including sex, age, deprivation category and general practitioner.

All analyses were undertaken using the SPSS V.11.0 and EpiInfo 2002.

RESULTS

AF read codes used

The vast majority (99.3%) of contacts were coded as AF (84.6%), AF/atrial flutter (9.8%), paroxysmal AF (3.5%) or atrial flutter (1.4%).

Prevalence of AF

The prevalence of AF was 8.7/1000 and was higher in men (9.4/1000) than in women (7.9/1000). Prevalence increased with age

Table 1 Prevalence, incidence and contact rates per 1000 population by sex and age group for all continuous morbidity recording practices in Scotland, April 2001 to March 2002

Age group (years)	Population	Number of patients with AF	Prevalence rate	Number of first diagnoses of AF	First ever incidence rate	Number of contacts for AF	Contact rate	Number of contacts per patient with first diagnosis of AF	Number of contacts per patient with recurrent or persistent AF
Men									
<45	110 080	42	0.4	6	0.1	39	0.4	4.17	0.39
45–54	25 763	126	4.9	20	0.8	116	4.5	2.35	0.65
55–64	19 929	305	15.3	34	1.7	350	17.6	2.47	0.98
65–74	13 740	539	39.2	52	3.8	611	44.5	2.67	0.97
75–84	7256	532	73.3	54	7.4	545	75.1	2.85	0.82
>85	1628	137	84.2	14	8.6	102	62.7	2.36	0.56
>65	22 624	1208	53.4	120	5.3	1258	55.6	2.72	0.86
>75	8884	669	75.3	68	7.7	647	72.8	2.75	0.77
All ages	178 396	1681	9.4	180	1.0	1763	9.9	2.68	0.85
Women									
<45	106 743	29	0.3	3	0.0	12	0.1	1.00	0.35
45–54	25 185	34	1.4	4	0.2	63	2.5	7.75	1.07
55–64	20 304	127	6.3	12	0.6	118	5.8	1.75	0.84
65–74	15 959	368	23.1	43	2.7	398	24.9	2.81	0.85
75–84	11 241	612	54.4	61	5.4	601	53.5	2.49	0.81
>85	4327	284	65.6	32	7.4	201	46.5	2.59	0.47
>65	31 527	1264	40.1	136	4.3	1200	38.1	2.62	0.75
>75	15 568	896	57.6	93	6.0	802	51.5	2.53	0.71
All ages	183 759	1454	7.9	155	0.8	1393	7.6	2.65	0.76
Both sexes									
<45	216 823	71	0.3	9	0.0	51	0.2	3.11	0.37
45–54	50 948	160	3.1	24	0.5	179	3.5	3.25	0.74
55–64	40 233	432	10.7	46	1.1	468	11.6	2.28	0.94
65–74	29 699	907	30.5	95	3.2	1009	34.0	2.74	0.92
75–84	18 497	1144	61.8	115	6.2	1146	62.0	2.66	0.82
>85	5955	421	70.7	46	7.7	303	50.9	2.52	0.50
>65	54 151	2472	45.7	256	4.7	2458	45.4	2.66	0.80
>75	24 452	1565	64.0	161	6.6	1449	59.3	2.62	0.73
All ages	362 155	3135	8.7	335	0.9	3156	8.7	2.67	0.81

AF, atrial fibrillation.

Table 2 Incidence, prevalence and contact rates (per 1000 population), stratified by socioeconomic status for April 2001 to March 2002

Deprivation category	Population	Number of patients with AF	Prevalence	Age and sex standardised prevalence	Number of first diagnoses of AF	Incidence	Age and sex standardised incidence	Number of contacts for AF	Contact rate	Age and sex standardised contact rate	Number of contacts per patient
1 (least)	79 765	709	8.9	9.2	60	0.8	0.6	669	8.4	8.6	0.94
2	70 368	653	9.3	8.9	74	1.1	0.8	641	9.1	8.7	0.98
3	110 216	992	9.0	9.5	113	1.0	0.9	1010	9.2	9.6	1.02
4	68 835	549	8.0	7.5	59	0.9	0.8	644	9.4	8.8	1.17
5 (most)	31 520	229	7.3	7.5	29	0.9	0.8	191	6.1	6.1	0.83
Rate ratio (95% CI) for deprivation category 5 vs 1			0.82 (0.70 to 0.95)	0.82 (0.72 to 0.92)		1.22 (0.79 to 1.91)	1.25 (0.74 to 1.76)		0.72 (0.67 to 0.76)	0.71 (0.66 to 0.76)	0.88 (0.82 to 0.94)
p Value for trend			0.002	0.02		0.537	0.7		<0.001	0.02	0.01

AF, atrial fibrillation.

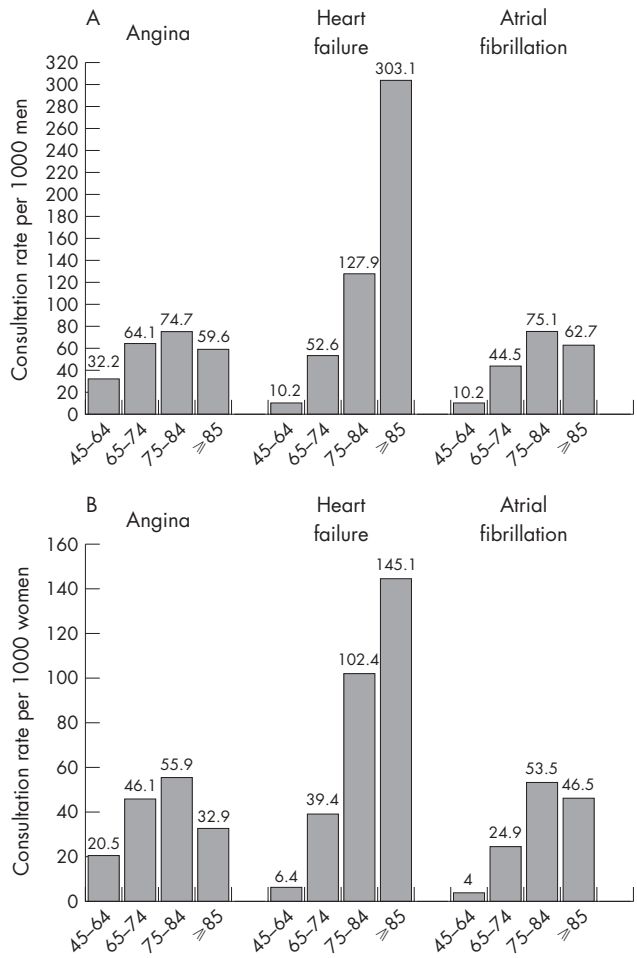

Figure 1 Age-stratified general practitioner consultation rates per 1000 population for heart failure, angina and atrial fibrillation in men (A) and women (B).

from 0.3/1000 in <45 years to 30.5/1000 in 65–74 years, and more than doubling to 70.7/1000 in >85 years (table 1).

Age and sex standardised prevalence of AF decreased with increasing socioeconomic deprivation from 9.2/1000 in the least deprived to 7.5/1000 in the most deprived category (p for trend = 0.02). Deprived individuals had an 18% lower prevalence than more affluent individuals (table 2).

Incidence of AF

The incidence of AF was 0.9/1000–1.0/1000 in men and 0.8/1000 in women. Incidence in men increased with age from 0.1/1000 in men aged <45 years to 3.8/1000 in 65–74 years to 8.6/1000 in those aged >85 years. The corresponding rates for women were 0.0/1000, 2.7/1000 and 7.4/1000, respectively (table 1).

There was no difference in the incidence of AF according to the deprivation class (table 2, p for trend = 0.537), although the number of cases in each category was small.

Contact rates for atrial fibrillation

The 1-year contact rate was higher in men (9.9/1000) than in women (7.6/1000, table 1). The contact rate varied with age, initially increasing from 0.2/1000 in <45 years to 62.0/1000 in 75–84 years, but falling to 50.9/1000 in >85 years. The average number of contacts per patient with newly diagnosed AF was highest in men aged <45 years (4.17) and women aged 45–54 years (7.75).

The proportions of consulting women aged >65 years and >75 years were 86.1% and 57.6%, respectively (the corresponding proportions in men were 71.4% and 36.7%, respectively).

Age and sex standardised contact rates fell from 8.6/1000 in the most affluent group to 6.1/1000 in the most deprived group (table 2). Deprived individuals had a 29% lower contact rate than more affluent individuals (p for trend = 0.02).

Comparison with contact rates for angina and heart failure

The contact rates for HF and angina in 2002 were 14.3/1000 and 17.0/1000, respectively, for men and 14.6/1000 and 13.5/1000, respectively, for women. Consultation rates for AF were lower than those for angina in younger individuals and similar to those for angina in those aged >75 years (fig 1). Consultation rates for AF were considerably lower than those for HF in men and women aged >65 years.

Top 10 concomitant diagnoses in patients with AF

In both sexes, hypertension was the most common concomitant diagnostic coding (in 24.8% of men and 27.1% of women, table 3). Respiration, infection, coronary heart disease and heart failure were the next most commonly coded conditions. Stroke was recorded only in 4.7% of men and women.

AF was the 19th most common reason for consulting a GP in men 65–74 years, and the 21st most common reason in those >85 years. In women 65–74 years AF was in position 49, whereas in women >85 years it was in position 31.

Table 3 Proportion of patients with atrial fibrillation seen with specified condition/illness, April 2001 to March 2002

Condition/illness	Men (%)	Women (%)
Hypertension	24.8	27.1
Lower respiratory tract infection	16.5	20.4
Coronary heart disease—miscellaneous	16.2	12.6
Heart failure	15.3	19.8
Upper respiratory tract infection (excluding sore throat)	9.5	11.1
Chest pain	9.2	9.1
Miscellaneous	9.2	9.4
Breathlessness	9.2	13.2
Back problems	9.2	–
Diabetes	8.2	–
Urinary tract infection	–	11.9
Stroke	4.7	4.7

Table 4 Pharmacological treatment of men with atrial fibrillation, April 2001 to March 2002

Treatment	Age group, n (%)								
	<45 years (n = 42)	45–54 years (n = 126)	55–64 years (n = 305)	65–74 years (n = 539)	75–84 years (n = 532)	>85 years (n = 137)	<75 years (n = 1012)	⩾75 years (n = 669)	All ages (n = 1681)
β-Blocker	12 (28.6)	46 (36.5)	107 (35.1)	181 (33.6)	139 (26.1)	13 (9.5)	346 (34.2)	152 (22.7)	498 (29.6)
CCBs*	17 (40.5)	67 (53.2)	153 (50.2)	262 (48.6)	206 (38.7)	23 (16.8)	499 (49.3)	229 (34.2)	728 (43.3)
Digoxin	2 (11.1)	33 (26.2)	112 (36.7)	216 (40.1)	223 (41.9)	73 (53.5)	363 (35.9)	296 (44.2)	659 (39.2)
Class I antiarrhythmics†	2 (4.8)	6 (4.8)	16 (5.2)	15 (2.8)	9 (1.7)	0 (0)	39 (3.9)	9 (1.3)	48 (2.9)
Amiodarone	5 (11.9)	17 (13.5)	49 (16.1)	64 (11.9)	56 (10.5)	11 (8.0)	135 (13.3)	67 (10.0)	202 (12.0)
Sotalol	3 (7.1)	10 (7.9)	26 (8.5)	30 (5.6)	26 (4.9)	2 (1.5)	69 (6.8)	28 (4.2)	97 (5.8)
Warfarin	10 (23.8)	43 (34.1)	146 (47.9)	292 (54.2)	238 (44.7)	37 (27.0)	491 (48.5)	275 (41.1)	766 (45.6)
Aspirin	6 (14.3)	32 (25.4)	114 (37.4)	209 (38.8)	275 (51.7)	79 (57.7)	361 (35.7)	354 (52.9)	715 (42.5)
Clopidogrel	0 (0.0)	3 (2.4)	2 (0.7)	21 (3.9)	14 (2.6)	4 (2.9)	26 (2.6)	18 (2.7)	44 (2.6)
Any antithrombotic‡	14 (33.3)	64 (50.8)	223 (73.1)	451 (83.7)	452 (85.0)	110 (80.3)	752 (74.3)	562 (84.0)	1314 (78.2)
Negative chronotropes§	18 (42.9)	82 (65.1)	213 (69.8)	389 (72.2)	365 (68.6)	86 (62.8)	702 (69.4)	451 (67.4)	1153 (68.6)
Any antiarrhythmic¶	10 (23.8)	31 (24.6)	84 (27.5)	105 (19.5)	91 (17.1)	13 (9.5)	230 (22.7)	104 (15.5)	334 (19.9)

CCB, calcium-channel blocker.
*Excluding dihydropyridines.
†Includes quinidine, disopyramide, propafenone and flecainide.
‡Warfarin or aspirin or clopidogrel.
§β-Blocker or rate-limiting CCB or digoxin.
¶Class 1 antiarrhythmic or amiodarone or sotalol.

Concomitant medication

Altogether 71% of patients with AF received rate-controlling medication: β-blocker 28%, rate-limiting calcium-channel blocker (CCB) 42% and digoxin 43%. Among men (table 4), 31% received one rate-limiting agent and 38% received more than two drugs. The respective proportions for women (table 5) were 39% and 35%. In all, 19% of patients received an antiarrhythmic drug. In all, 42% of patients received warfarin, 44% aspirin and 78% received more than one of these.

Gender, age and socioeconomic differences in prescribing

On multivariable modelling, after adjusting for deprivation, age and GP practice, women were 25% more likely to receive digoxin and 18% less likely to receive warfarin compared with men (table 6).

On multivariable modelling, men and women aged ⩾75 years were more likely to receive digoxin (men OR 1.41, 95% CI 1.14 to 1.74; women OR 1.88, 95% CI 1.50 to 2.37) and aspirin (2.04, 1.66 to 2.51; 1.79, 1.42 to 2.25) than those aged <75 years, and less likely to receive an antiarrhythmic drug (0.62, 0.48 to 0.81; 0.52, 0.39 to 0.70) or warfarin (0.74, 0.60 to 0.91; 0.58, 0.46 to 0.73).

After adjusting for age, sex and GP, there was no socioeconomic gradient in prescribing.

DISCUSSION

The prevalence of AF in Scotland in 2001–2 was 8.7/1000, was higher in men than in women (and higher in the less socioeconomically deprived than in the more socioeconomically deprived) and increased strikingly with age (to 64/1000 in those aged >75 years). Digoxin was used much less commonly, and rate-limiting CCBs and β-blockers more commonly, than in older studies. Women and older individuals were, however, less likely to be prescribed warfarin and more likely to be prescribed digoxin than a β-blocker or rate-limiting CCB for rate control.

Prevalence

Other UK primary care studies have reported on the prevalence of AF.

Table 5 Pharmacological treatment of women with atrial fibrillation, April 2001 to March 2002

Treatment	Age group, n (%)								
	<45 years (n = 29)	45–54 years (n = 34)	55–64 years (n = 127)	65–74 years (n = 368)	75–84 years (n = 612)	>85 years (n = 284)	<75 years (n = 558)	⩾75 years (n = 896)	All ages (n = 1454)
β-Blocker	1 (3.4)	6 (17.6)	43 (33.9)	96 (26.1)	178 (29.1)	45 (15.8)	146 (26.2)	223 (24.9)	369 (25.4)
CCB*	5 (17.2)	11 (32.4)	73 (57.5)	165 (44.8)	267 (43.6)	71 (25.0)	254 (45.5)	338 (37.7)	592 (40.7)
Digoxin	2 (6.9)	11 (32.4)	43 (33.9)	159 (43.2)	303 (49.5)	177 (62.3)	215 (38.5)	480 (53.6)	695 (47.8)
Class I antiarrhythmics†	3 (10.3)	4 (11.8)	8 (6.3)	13 (3.5)	8 (1.3)	1 (0.4)	28 (5.0)	9 (1.0)	37 (2.5)
Amiodarone	2 (6.9)	6 (17.6)	13 (10.2)	47 (12.8)	73 (11.9)	12 (4.2)	68 (12.2)	85 (9.5)	153 (10.5)
Sotalol	2 (6.9)	2 (5.9)	12 (9.4)	26 (7.1)	29 (4.7)	7 (2.5)	42 (7.5)	36 (4.0)	78 (5.4)
Warfarin	5 (17.2)	14 (41.2)	62 (48.8)	176 (47.8)	246 (40.2)	60 (21.1)	257 (46.1)	306 (34.2)	563 (38.7)
Aspirin	2 (6.9)	4 (11.8)	48 (37.8)	151 (41.0)	290 (47.4)	159 (56.0)	205 (36.7)	449 (50.1)	654 (45.0)
Clopidogrel	0 (0.0)	0 (0.0)	4 (3.1)	13 (3.5)	19 (3.1)	8 (2.8)	17 (3.0)	27 (3.0)	44 (3.0)
Any antithrombotic‡	7 (24.1)	16 (47.1)	96 (75.6)	308 (83.7)	495 (80.9)	209 (73.6)	427 (76.5)	704 (78.6)	1131 (77.8)
Negative chronotropes§	7 (24.1)	16 (47.1)	91 (71.1)	279 (75.8)	466 (76.1)	216 (76.1)	393 (70.4)	682 (76.1)	1075 (73.9)
Any antiarrhythmic¶	7 (24.1)	11 (32.4)	32 (25.2)	81 (22.0)	108 (17.6)	20 (7.0)	131 (23.5)	128 (14.3)	259 (17.8)

CCB, calcium-channel blocker.
*Excluding dihydropyridines.
†Includes quinidine, disopyramide, propafenone and flecainide.
‡Warfarin or aspirin or clopidogrel.
§β-Blocker or rate-limiting CCB or digoxin.
¶Class 1 antiarrhythmic or amiodarone or sotalol.

Table 6 Relative risk of being prescribed various medications for women compared with men (adjusted for practice, age and deprivation category), aged >75 years compared with those aged <75 years (adjusted for practice and deprivation category) and for Carstairs deprivation category 5 compared with Carstairs deprivation category 1 (adjusted for age, sex and practice)

		⩾75 years vs <75 years		
	Women vs men	Men	Women	Carstairs deprivation category 5 vs 1
β-Blockers	0.92 (0.78 to 1.09)	0.55 (0.44 to 0.70)	0.89 (0.69 to 1.16)	0.72 (0.43 to 1.21)
CCBs*	1.05 (0.91 to 1.24)	0.51 (0.42 to 0.64)	0.69 (0.55 to 0.87)	0.73 (0.45 to 1.19)
Digoxin	1.25 (1.07 to 1.46)	1.41 (1.14 to 1.74)	1.88 (1.50 to 2.37)	1.00 (0.62 to 1.63)
Class I antiarrhythmics†	1.34 (0.84 to 2.13)	0.32 (0.15 to 0.67)	0.14 (0.06 to 0.32)	0.62 (0.14 to 2.82)
Amiodarone	0.94 (0.74 to 1.19)	0.73 (0.53 to 1.01)	0.77 (0.54 to 1.03)	1.10 (0.49 to 2.48)
Sotalol	1.11 (0.80 to 1.54)	0.60 (0.38 to 0.96)	0.48 (0.30 to 0.79)	0.51 (0.18 to 1.50)
Warfarin	0.82 (0.70 to 0.96)	0.74 (0.60 to 0.91)	0.58 (0.46 to 0.73)	1.21 (0.75 to 1.96)
Aspirin	0.93 (0.80 to 1.08)	2.04 (1.66 to 2.51)	1.79 (1.42 to 2.25)	0.78 (0.48 to 1.26)
Any antithrombotic	0.85 (0.70 to 1.03)	1.81 (1.40 to 2.35)	1.11 (0.85 to 1.45)	1.11 (0.61 to 2.03)
Negative chronotropes§	1.28 (1.08 to 1.51)	0.90 (0.72 to 1.12)	1.33 (1.03 to 1.72)	0.97 (0.56 to 1.70)
Any antiarrhythmic¶	1.03 (0.85 to 1.24)	0.62 (0.48 to 0.81)	0.52 (0.39 to 0.70)	0.80 (0.42 to 1.50)

CCBs, calcium-channel blockers.
*Excluding dihydropyridines.
†Includes quinidine, disopyramide, propafenone and flecainide.
‡Warfarin or aspirin or clopidogrel.
§β-Blocker or rate limiting calcium channel blocker or digoxin.
¶Class 1 antiarrhythmic or amiodarone or sotalol.

A study of the records of 4522 patients aged ⩾50 years in two GPs in West Birmingham taking drugs relevant to the treatment of AF showed that 111 (2.4%) had the arrhythmia, indicating a similar prevalence as in those aged ⩾45 years (2.1%) in CMR.[15] Electrocardiographic screening of 4843 subjects in 26 GPs in Northumberland, England, revealed a 4.7% prevalence of AF in individuals aged ⩾65 years, comparable to the 4.6% prevalence in the same age group in CMR.[16] The prevalence of AF was estimated from the computer records of 211 GPs in England and Wales, from 1994–8, using the General Practice Research Database (GPRD).[17] The prevalence of AF in 1994 was very similar to that in CMR, but the prevalence in 1998 was considerably higher—for example, 9.5% in men and 7.2% in women aged 75–84 years compared with 7.3% and 6.2%, respectively. The prevalence of read-coded AF in 131 GPs included in the DIN-LINK database increased from 1994 to 2003—from 0.84% to 1.49% in men and from 0.83% to 1.29% in women.[18] The overall prevalence in the DIN-LINK database, as well as the only age-specific prevalence reported (13.2% in men and 11.0% in women aged ⩾85 years in 2003 compared with 8.4% and 6.6%, respectively, in our study), was considerably higher than in CMR, as well as in other UK studies. Even taking into account the increase in recorded prevalence that has occurred over time, our prevalence rate seems to be lower than that found in the DIN-LINK database. One possible explanation for this is that our analysis only included patients consulting their GP (for any reason) during the year of study. Consequently, we would not have identified a patient with AF who did not contact a GP for any reason in the period April 2001 to March 2002. However, our prior analyses of the epidemiology of HF and angina using CMR data have given estimates very consistent with those from other parts of the UK and elsewhere.[12 13] Geographical variation and, particularly, differences in socioeconomic status (see below) might also have accounted for some of the differences observed. Our prevalence rates were similar to those found in a primary care study in the Netherlands[19] and in a report from the Kaiser Permanente system in Northern California.[20]

We found that the prevalence of AF decreased with increasing socioeconomic deprivation, which has not been reported before and which contrasts with other cardiovascular disorders. Possible reasons for the higher recorded prevalence of AF in more affluent patients may be higher rates of certain types of contact with GPs leading to diagnosis (eg, greater uptake of health screening and more recording of electrocardiograms) and reduced survival in more deprived patients with AF.

Incidence

There are few studies on the incidence of AF. The incidence of AF in patients aged 40–89 years was estimated to be 1.7/1000 person-years in the GPRD in 1996.[21] This was comparable to the 2/1000 per year incidence in patients aged 45–84 years in our study. However, the Framingham Heart,[22] Cardiovascular Health[23] and Olmsted County studies,[24] all from the USA, reported much higher incidence rates than either the CMR or the GPRD. This can be explained by methods of ascertainment. In our study, and in the GPRD analysis, only patients who attended their GP with symptoms or who had an incidental finding of AF would have been identified. By contrast, in the studies from the USA, either regular examination (including recording of an electrocardiogram) of subjects or examination of hospital records and other physician records was conducted over a long period of follow-up.

Primary care burden

There is little information on the healthcare burden created by AF in GP. Patients with AF have few contacts with their GP—approximately one per year—and AF was not one of the common reasons for a patient to contact his or her GP. The consultation rate for AF was less than that for angina in subjects aged <75 years, but greater than that for angina above that age; the contact rate for AF was much less than that for heart failure. These data, however, underestimate the complete community burden related to AF, as many patients in Scotland at the time of this survey had anticoagulation monitoring in hospital-based clinics.

Medication

The few prior reports on the pharmacological treatment of AF have focused on the use of antithrombotic treatment. Our observations confirm the finding of other recent studies from the UK that about 40% of patients receive warfarin,[15 18 21 25] a considerably higher proportion than in earlier reports.[16] Although we do not know what proportion of patients should have been treated with warfarin (because we did not know

which of our patients had an indication or contraindication to warfarin), other investigators have estimated that between 40–60% of patients might benefit from anticoagulation.[16 26] Paradoxically, however, warfarin was less likely to be prescribed in women and in older people, both of whom are at greater risk of stroke. This has been a repeated finding in both older and more recent studies, and suggests that there is still an educational deficit in these respects.[27]

There is much less recent information on the use of other medications to treat AF in primary care. We found that 71% of patients were treated with an agent that controls ventricular rate: 43% with digoxin, 42% with a CCB and 28% with a β-blocker. This is a quite different pattern than in older studies that showed that digoxin was the most common agent of this type used.[15] As recently as 1996, digoxin was used in approximately 70% of cases in the GPRD.[21] Recent recommendations preferring CCBs and β-blocker for rate control may, therefore, have influenced clinical practice.[28] Older patients, however, were less likely to be treated with these more effective agents and were more likely to be treated with digoxin. Older individuals were also less likely to be prescribed antiarrhythmic agents. Duration of atrial fibrillation and differential referral to secondary care may explain some of the age-related differences in prescribing.

It is interesting, however, to contrast prescribing in Scotland with the rest of Europe. A recent Euro Heart Survey, conducted in 2003–4, described the treatment of AF in secondary care in 35 countries. Digoxin was prescribed for 23% of patients with persistent and 50% of patients with permanent AF.[29] A β-blocker (excluding sotalol) was used as an antiarrhythmic or rate-controlling agent in 30% of patients with persistent or permanent AF (which is similar to our study), but only 10% of these patients were prescribed a rate-limiting CCB, a much lower rate than in our study.[29]

Also of interest was our finding that, although prevalence and contact rates differed according to socioeconomic status, treatment did not. This is in keeping with prior findings in other disease areas and may relate to the greater use of secondary care by more deprived individuals.[12 13]

Limitations

AF is frequently asymptomatic[30] and cases may be missed if the patient is not examined or an ECG recorded—for example, AF was an incidental finding on ECG in 12% of cases in the Cardiovascular Health Study.[23] Also, many cases are paroxysmal. Consequently, our findings almost certainly underestimate the prevalence and incidence of all types of AF.

SUMMARY

We have confirmed the higher prevalence and incidence of AF with increasing age and in men. We have made the novel observation that the prevalence of AF fell with increasing socioeconomic deprivation. This unexpected finding deserves further investigation as it probably reflects poorer detection, prognosis or both in more deprived individuals. We have shown that the rate of prescription of warfarin was higher than in past studies, and that CCBs and β-blockers are now more commonly (and digoxin less commonly) used for rate control than reported previously. Women and older individuals, however, were less likely to be prescribed warfarin and older subjects less likely to be prescribed more effective rate-controlling treatment with a CCB or a β-blocker. This suggests that there is still a need for education regarding the risks and benefits of the pharmacological treatments of AF in women and older people.

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IMAGES IN CARDIOLOGY

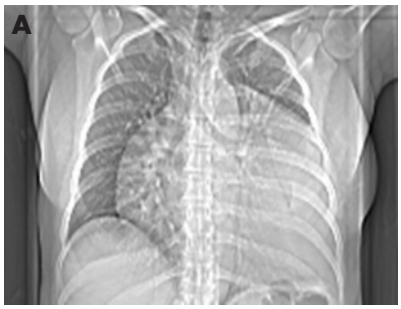
Epicardial lipoma mimicking pericardial effusion

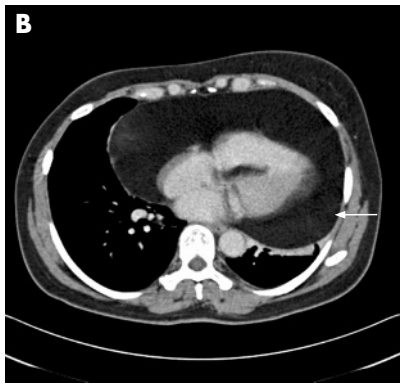
A previously well 47-year-old woman presented with a 4-week history of non-productive cough and lethargy without weight loss, orthopnoea or exertional dyspnoea. She was normotensive and a non-smoker.

Clinical examination was unremarkable, and no lymphadenopathy was detected. Routine blood tests including inflammatory markers were normal. The electrocardiogram showed sinus rhythm with non-specific T wave changes in the lateral chest leads. The chest radiograph showed an enlarged, globular cardiac silhouette mimicking pericardial effusion. No previous chest radiographs were available for comparison.

Transthoracic echocardiography revealed an extensive homogeneous mass surrounding the heart, with no evidence of compression or left ventricular hypertrophy. Computed tomography and magnetic resonance (MR) imaging showed an extensive fat density mass enveloping the heart and arising from the epicardium, maximally 5.8 cm in radius (panels A–C; arrows show extensive (5.8 cm) epicardial lipoma surrounding the heart). There was no associated mediastinal lymphadenopathy.

Over three months she developed progressive exertional dyspnoea with development of restrictive respiratory physiology: forced expiratory volume in 1 second (FEV_1) 1.26 litres (56% predicted), forced vital capacity (FVC) 1.56 litres (59% predicted). A repeat MR scan suggested right heart compression. She underwent surgical resection of a massive lobulated fatty tumour via median sternotomy, with resolution of her symptoms. Histological examination revealed mature adipocytes typical of a benign lipoma.





Epicardial lipomata can mimic pericardial fluid on plain radiographs of the chest. These tumours are rare, accounting for 10% of primary cardiac tumours, and often clinically silent. Proximity of the tumour to the coronary arteries may limit resection. This case is unusual for the rapid progression of symptoms caused by cardiac and pulmonary compression.

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